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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/738,362	12/15/2000	Minoru Noguchi	10936-57	9812

24256 7590 10/08/2002

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EXAMINER	
LISH, PETER J	
ART UNIT	PAPER NUMBER
1754	4

DATE MAILED: 10/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/738,362	Applicant(s) NOGUCHI ET AL.	
	Examiner Peter J Lish	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-18 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 17-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 17-18 recites the limitation "the" in "the durability test" (line 3). There is insufficient antecedent basis for this limitation in the claim. Whereas a durability test is described in claim 16, neither one of claims 17-18 are dependent on claim 16

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 6, 11, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Okuyama et al. (USPN 5,956,225) with reference to Setoyama et al. ("Simulation Study on the Relationship Between...").

Okuyama et al. disclose activated carbon, for use in an electrode of a double layer capacitor, containing many pores with a pore diameter of not less than 20 Angstroms (2.0 nm) in the pore distribution determined from the nitrogen adsorption isotherm. The ratio of pore volume with a diameter of not less than 20 Angstroms to total pore volume is greater than 0.45, and reaches as high as 75% in Example 1.

The relationship of pore size to filling swing is known by reference to the teaching of Setoyama, which states that pores of width higher than 1.4 nm show no filling swing, while pores of width 1.2 - 1.3 nm show only very slight filling swing (see figure 6). An activated carbon having pores with widths greater than 1.4 nm would have zero filling swing. Therefore, the activated carbon material of Okuyama et al., having pores almost entirely above a width of 2.0 nm has a rate of filling swing less than 25 cm^3/g STP.

Concerning claim 6, Okuyama teaches that the specific surface area as determined from the nitrogen adsorption test is not less than 1000 m^2/g and preferably from 1000 – 2500 m^2/g (column 5, lines 33-37).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu (JP 09162082A) in view of Setoyama et al. ("Simulation Study on the Relationship Between…") and taken with Ohsaki et al. (USPN 5,985,489).

Shimizu discloses the production of an electric double layered capacitor which can suppress capacitance deterioration. This deterioration is caused by the decomposition of the electrolyte, resulting in a gas which causes impediment to the ion adsorption by covering a surface of the activated carbon electrode. Shimuzu's capacitor provides a lowered pressure in order to decrease

the interaction between the gas and the electrode surface and therefore provide for greater durability.

Ohsaki et al. teach a means by which the pore sizes of activated carbon may be adjusted, however does not make note the phenomenon of filling swing. Setoyama et al. disclose that the effect known as "filling swing", or FS, which occurs during the nitrogen adsorption test on a porous activated carbon, is ascribed to the enhanced surface-molecule interaction caused by the walls of micropores. The enhanced interaction leads to a greater adsorption rate of gas at low pressures. This increased adsorption results in a deviation on the a_S plots below an a_S of 0.5, the area of which (or the "rate of filling swing") depends on the pore width (page 1463, column 2). Therefore, it would have been obvious to one of ordinary skill at the time of invention to apply the process of Ohsaki to the material of Shimizu in order to produce activated carbon containing a pore width of a desired size (primarily above 1.2 nm), if the material of Shimizu does not already possess pores of this size, in order to decrease the interaction between the gas created by electrolyte decomposition and the activated carbon surface and thus provide for greater durability.

In re Boesch (205 USPQ 215) holds that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. Therefore, concerning claim 3, the optimization of the pore size (corresponding to the rate of filling swing) would have been obvious to one of ordinary skill at the time of invention.

Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuyama as applied to claim 1 above, and further taken with Kaneko et al. (USPN 5,997,613) and in view of Hiratsuka et al. ("Evaluation of Activated Carbon Electrodes...").

Okuyama does not teach an activated carbon electrode with an oxygen content of less than 3-5%. However, Kaneko teaches that activated carbon fibers prepared from pitch in the conventional manner have an oxygen content of about 1.0 to 1.5% by weight (column 2, lines 32-38). Furthermore, Hiratsuka et al. teach that the capacitance of a carbon electrode after voltage application for an extended time (a measure of durability) decreases more in carbon electrodes with higher oxygen content (Figure 10). Thus, in order to provide the best durability, it would have been obvious to one of ordinary skill at the time of invention to prepare the carbon fibers of Okuyama in order to have a low oxygen content, as taught by Kaneko.

Claim 8-10, 12, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuyama et al. as applied to claims 1, 11, and 13 above, and further in view of Hirahara et al. (USPN 6,094,338).

Okuyama teaches that a carbonaceous material be subjected to a carbonization treatment, an oxidation treatment, and an activation treatment, and further that the resulting material be used as the electrode in a double layer capacitor. The details as to the type of carbonaceous material or the steps used in forming the electrode and the capcitor are not disclosed.

Regarding claims 8-10, Hirahara teaches that activated carbon material may be formed from a variety of raw materials including coconut shells, coal pitch or petroleum pitch, and polyvinylidene chloride resins. He further teaches that these materials are carbonized and then activated by either gas-activation or chemical-activation, and additionally that as the chemicals used for the activation, there may be exemplified zinc chloride (column 8, line 54 to column 9, line 11). It therefore would have been obvious to one of ordinary skill at the time of invention to produce the carbon of Okuyama as taught by Hirahara.

Regarding claims 12 and 14-15, Hirahara teaches that the polarized electrodes comprise mainly activated carbon, a conductive agent, and a binder (column 9, lines 54-56). These electrodes were then implemented into a structure with a separator held between the two electrodes in an electrolytic solution-containing case (FIG 2). Hirahara also teaches that in order to obtain a capacitor having a large applicable voltage and a large energy density, the use of a non-aqueous electrolyte is preffered (column 11, lines 40-43). It therefore would have been obvious to one of ordinary skill at the time of invention to produce the electrode and capacitor system of Okuyama as taught by Hirahara.

Regarding claim 16, Hirahara discloses a capacitor which being maintained at 70 C and having a voltage of 2.8 V applied for 500 hours, the loss of capacitance was only 4.4% (Example 6). This test exceeds the conditions for the test as limited in claim 16, while yielding an extremely high retention of capacitance.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu and Ohsaki as applied to claim 3 above, and further taken with Kaneko as applied to claims 4-5 above, and further taken with Okuyama as applied to claim 6 above. It would have been obvious to one of ordinary skill at the time of invention to combine these references, as they all teach the common art involving the production of activated carbon electrodes for use in double layer capacitors.

Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuyama et al. as applied to claim 13 above, and further in view of Hiratsuka et al (USPN 6,072,692). Okuyama does not perform a resistance test on the activated carbon electrodes of his disclosure. Hiratsuka, however, teaches the use of a strong connection between the current collector and the electrode to

produce an electric double layer capacitor containing activated carbon electrodes, wherein retention of resistance is 104% and retention of capacitance is 96% as calculated after a reliability test (Example 3). Therefore it would be obvious to one of ordinary skill at the time of invention to combine the high pores widths of Okuyama with the teaching of Hiratsuka to produce capacitors with similar reliability test results.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Lish whose telephone number is 703-308-1772. The examiner can normally be reached on 9:00-6:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-305-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

PL
September 25, 2002

STUART L. HENDRICKSON
PRIMARY EXAMINER